

Serial No. 10/530,554
Amendment dated April 30, 2007
Official Action dated November 30, 2006

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Amendments to the Claims:

The following listing of claims replaces all prior versions and listings of the claims in this application.

Listing of the Claims:

Claim 1 (Currently Amended): A process for producing an aliphatic polyester by subjecting a cyclic ester to bulk ring-opening polymerization, which comprises adding water to a cyclic ester purified to the extent that a water content is at most 60 ppm to control an overall proton concentration in the cyclic ester, thereby controlling at least one physical property among melt viscosity, molecular weight and yellowness index of the resulting aliphatic polyester, wherein the overall proton concentration in the cyclic ester is calculated out on the basis of the total amount of hydroxycarboxylic compounds as impurities in the cyclic ester, water contained as impurities in the cyclic ester and water added to the cyclic ester.

Claim 2 (Canceled).

Claim 3 (Currently Amended): The production process according to claim 2 1, wherein the hydroxycarboxylic compounds are an α -hydroxycarboxylic acid and linear α -hydroxycarboxylic acid oligomers.

Claim 4 (Original): The production process according to claim 1, wherein the overall proton concentration of the impurities contained in the purified cyclic ester before the addition of water is within a range of 0.01 to 0.5 mol%.

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Claim 5 (Original): The production process according to claim 3, wherein the content of water in the purified cyclic ester before the addition of water is at most 50 ppm, the content of the α -hydroxycarboxylic acid is at most 100 ppm, and the content of the linear α -hydroxycarboxylic acid oligomers is at most 1,000 ppm.

Claim 6 (Original): The production process according to claim 1, wherein water is added to the purified cyclic ester to control the overall proton concentration in the cyclic ester within a range of higher than 0.09 mol%, but lower than 2.0 mol%.

Claim 7 (Original): The production process according to claim 1, wherein when water is added to the purified cyclic ester to control the overall proton concentration in the cyclic ester, the amount of water added to the cyclic ester is controlled on the basis of a relational expression between a predetermined overall proton concentration in the cyclic ester and a physical property value to be controlled so as to give an overall proton concentration corresponding to a targeted value of the physical property to be controlled.

Claim 8 (Original): The production process according to claim 7, wherein the relational expression is a relational expression of a linear model, double logarithm model or semilogarithm model, which is obtained by conducting ring-opening polymerization with the overall proton concentration in the cyclic ester varied, using, as a database, measured results of the melt viscosity, molecular weight or yellowness index of aliphatic polyesters obtained by the ring-opening polymerization of the cyclic esters of the respective overall proton concentrations, and subjecting the database to regression analysis.

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Claim 9 (Original): The production process according to claim 8, wherein the relational expression is a relational expression of a semilogarithm model represented by the following expression (1), in which the overall proton concentration x in the cyclic ester is used as an independent variable, and the melt viscosity y is used as a dependent variable,

$$y = a \cdot b^x \quad (1)$$

wherein, a and b are parameters.

Claim 10 (Original): The production process according to claim 1, wherein water is added to the purified cyclic ester to control the overall proton concentration in the cyclic ester, the cyclic ester is heated and melted in the presence of a catalyst, and the cyclic ester in the molten state is then subjected to ring-opening polymerization to deposit a polymer formed.

Claim 11 (Original): The production process according to claim 1, wherein water is added to the purified cyclic ester to control the overall proton concentration in the cyclic ester, the cyclic ester is heated and melted in the presence of a catalyst in a melting vessel, the cyclic ester in the molten state is transferred to a polymerization equipment with a plurality of tubes capable of being closed and opened at their both ends, and the cyclic ester is then subjected to ring-opening polymerization in the closed state in the respective tubes to deposit a polymer formed.

Claim 12 (Original): The production process according to claim 1, wherein water is added to the purified cyclic ester to control the overall proton concentration in the cyclic ester, the cyclic ester is heated and melted in the presence of a catalyst in a melting vessel, the ring-opening polymerization of the cyclic ester in the molten state is allowed to progress in a

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reaction vessel equipped with a stirrer, a polymer formed is taken out, the polymer is cooled and solidified once, and solid phase polymerization is then continued at a temperature lower than the melting point of the polymer.

Claim 13 (Original): The production process according to claim 1, wherein the cyclic ester is a cyclic diester of an α -hydroxycarboxylic acid, or a lactone.

Claim 14 (Currently Amended): The production process according to claim 13, wherein the cyclic diester of the α -hydroxy[[-]]carboxylic acid is glycolide or lactide.

Claim 15 (Original): The production process according to claim 1, wherein the cyclic ester is glycolide alone or a mixture of at least 60 % by weight of glycolide and at most 40 % by weight of another cyclic monomer ring-opening-copolymerizable with glycolide.

Claim 16 (Currently Amended): The production process according to claim 15, wherein the another cyclic monomer is lactide.

Claim 17 (Original): The production process according to claim 15, which obtains polyglycolic acid having a melt viscosity of 50 to 6,000 Pa·s as measured at a temperature of 240°C and a shear rate of 121 sec⁻¹.

Claim 18 (Original): The production process according to claim 15, which obtains polyglycolic acid having a weight average molecular weight of at least 50,000.

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Claim 19 (Original): The production process according to claim 15, which obtains polyglycolic acid having a yellowness index of 4 to 20.

Claim 20 (Original): The production process according to claim 15, which obtains polyglycolic acid having a weight average molecular weight of at most 200,000 and a yellowness index of at most 10.